Comparison of TanDEM-X surface velocity measurements and hydrodynamic model data in the Baltic Sea

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The ocean surface boundary layer constitutes the interface between the atmosphere and the deep ocean. Interaction between both is described by fluxes, whose correct estimation is strongly influenced by surface current and waves. It is important to include these effects into ocean circulation or coupled atmosphere-ocean models which are used e.g. in climate variability studies. Satellite SAR and along-track interferometry (ATI) can provide large area and spatially high-resolved information on parameters like surface current velocity, wind speed as well as wave heights and periods at the same time.

Since 2012 we have been carrying out data acquisitions with the TanDEM-X satellite formation for different test sites, including Fehmarn belt, Skagerrak, Gotland, ∅resund, Rügen and Darss Sill, as part of the “Remote Sensing and Earth System Dynamics” study. This aims at developing new satellite SAR data products, containing information on Earth processes. We use SAR-ATI and a dedicated processing system to extract ocean surface velocities. These measurements include contributions from currents, waves and the Stokes drift, which, for geophysical interpretation, must be discriminated. Therefore, we extract further information from the SAR data, like wind speed and wave parameters. They help in interpreting the velocity measurements as well as they represent relevant data products for themselves.

We present results from a cross-data analysis between SAR-ATI based ocean surface velocities and a numerical circulation model of the Baltic Sea (BSIOM) as well as examples of extracted parameters.